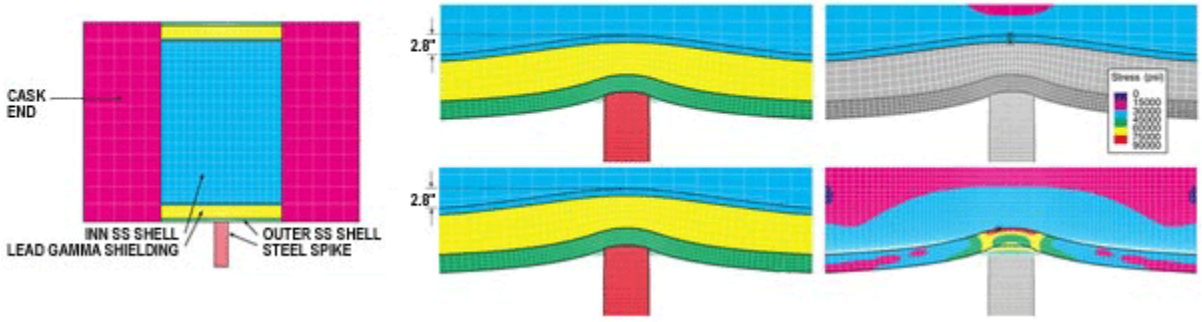
Structural Analysis

Structural analysis utilizes computer design and analysis tools to provide package designers and certifiers with the most accurate method of determining package response to transportation environments. Computer analysis is an application of known engineering principles that take advantage of high-power computing capabilities in solving the response of computer models to various environments with complex mathematical calculations.

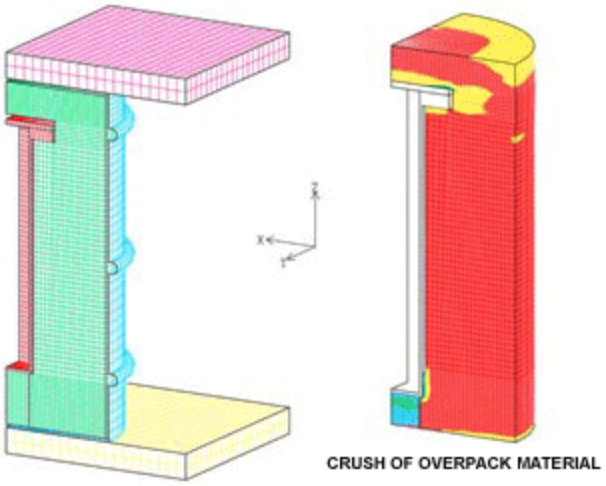
It can be used for package certification by generating a computer model of a test object (package) and subjecting it to an accident environment to understand its response. A computer model must be constructed with the same weights, dimensions, hardnesses, specific heat, conduction, etc. as an actual package, then an analysis of an accident environment is calculated.

The way that engineers ensure that the computer model of a specific package responds the same as a full-scale test in a specific accident is by benchmarking (verifing) the model with at least one full-scale test. This allows the engineer to conduct as many tests as required with the same package model. Sandia National Laboratories' Transportation Programs has conducted physical full-scale and scale-model tests for many types of packages and has used the results to benchmark the computer codes for structural and thermal analyses.

Sandia National Laboratories uses computer analysis to simulate a lead shielded 160-ton spent fuel cask to the regulatory puncture environment.



Sandia National Laboratories demonstrates a structural computer analysis of a 1100-pound steel plate dropped from 30-feet onto a Type B packaging in a dynamic crush.



CRUSH OF OVERPACK MATERIAL

For further information, see http://www.sandia.gov/tp/tp.htm